

Abstract of the Disclosure

[0039] A graded composite energy converting article having a working surface of carbon-bonded carbon-fiber (CBCF) material that can absorb light, RF, microwaves, or other forms of energy and convert this energy to sensible heat. Conversely, CBCF can take sensible heat and convert it to radiative emissions of IR energy. Energy is conducted through the article by carbon foam to a secondary surface. The graded composite is made by first heating pitch under pressure to create the foam, which is then pyrolyzed and graphitized to create graphitic, open-cell foam. A slurry of chopped carbon fibers and organic binder in water or solvent is prepared and deposited on a working surface of the foam, preferably infiltrating the foam to some depth. The green body is dried, cured, and carbonized, creating a graded body of carbon foam in conductive thermal contact with a working surface of CBCF. Secondary surfaces of the foam may optionally be metal-infiltrated for added strength, brazability, or other purposes. The article may be used for optical absorbers, baffles, beam stops, RF and microwave loads, radiators, electron collectors, and other uses where energy is passively converted from one form to another and superior thermal transport is required.

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